

Date: Wednesday, 7/11/2007 10:42:33 AM
 User: Jason Murdoch

Process Sheet

Customer : CC-DAR01 Dart Aerospace Ltd.	Drawing Name : D350-748-141	
Job Number : 33465		
Estimate Number : 10804		
P.O. Number : N/A	Part Number : D350748141	Split A DFD
This Issue : 7/11/2007 S.O. No. : N/A	Drawing Number : D350748141 NCR185	
Prsht Rev. : NC	Project Number : N/A	
First Issue : N/A	Drawing Revision : D OK 6.7.11	
Previous Run : 00015	Material : N/A	
Written By : _____	Due Date : 8/5/2007	Qty: 4 Um: 5 Each
Checked & Approved By : _____		
Comment : _____		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	D350748141	CROSSTUBE ASSY HIGH FWD
-----	------------	-------------------------



Comment: Qty.: 1.0000 Each(s)/Unit Total: 5.0000 Each(s)
 CROSSTUBE ASSY HIGH FWD
 Pull D350-748-141 work orders B31902; B31903; B31904; B31905; B31906' from sequence 10.0. Continue as follows. Per NCR 185

2.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
-----	----------------	-------------------------



Comment: LANDING GEAR RESOURCE 1
 Identify the D350-748-141 with the part number, and current batch number, in alphabetical sequence. ie:
 B33465-A; B33465-B.....

3.0	QC6	DIMENSIONAL CHECK
-----	-----	-------------------



Comment: DIMENSIONAL CHECK

7-07-11 (5)

4.0	BENDING	BENDING MACHINE
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Comment: BENDING MACHINE

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT_____

EL 7-7-11 (5)

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------



Comment: DIMENSIONAL CHECK OF X-TUBES

7-07-12 (5)

PTC
3rd page

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
07/05/20	#20	w/o was split to allow B33465 "L" & task to be completed	SW	07/05/20 H			En 07/05/20

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 7/11/2007 10:42:33 AM
User: Jason Murdoch

Process Sheet

Customer: CC-DAR01 Dart Aerospace Ltd.

Drawing Name: D350-748-141

Job Number: 33465

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Debur

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: M104161

*Rec'd PTO
*Before drilling
tube - E / -A

7-7-16

0707 16

5

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CHECK 10 DEG HOLES WITH DT8876E(EUROCOPTER CLAMP)

7-7-17
(5)

8.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 4203

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

7-10-18
(5)

9.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

7/8/17

59

(3X)

Date: Wednesday, 7/11/2007 10:42:33 AM
User: Jason Murdoch

Process Sheet

Customer: CC-DAR01 Dart Aerospace Ltd.

Drawing Name: D350-748-141

Job Number: 33465

Part Number: D350748141

Job Number:



Seq. #: Machine Or Operation: Description :

10.0

QC5

INSPECT WORK TO CURRENT STEP



B33465A
B33465B
B33465C
B33465D
B33465E



Comment: INSPECT WORK TO CURRENT STEP

9/18/17 all 5 tubes

11.0

SPRAY PAINTING

SPRAY PAINTING
B33465E



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Prime Outside of Tube as per Dart QSI 005 4.2

ml 07 08 18
19
20

(X5)

12.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

07-08-21

13.0

D35021

SUPPORT



SEE NCR ON NEXT
PAGE FOR REE "13"



Comment: Qty.: 2.0000 Each(s)/Unit Total: 10.0000 Each(s)

SUPPORT

Batch: 28476

ml 07 08 20

14.0

D2856400

Abrasion Strip



Comment: Qty.: 1.2401 f(s)/Unit Total: 6.2003 f(s)

Abrasion Strip 7.10" long x2

Batch: 32020

ml 07 08 20

15.0

ALS41032225

Insert



Comment: Qty.: 1.0000 Each(s)/Unit Total: 5.0000 Each(s)

Insert

Batch: 19393

ml 07 08 20

16.0

AN960JD10

Washer



Comment: Qty.: 1.0000 Each(s)/Unit Total: 5.0000 Each(s)

Washer

Batch: 100151

ml 07 08 20

WORK ORDER CHANGES

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-141 PAR #: NA Fault Category: Prod / Fab. ass ^{LADING GEN} NCR: Yes ☒ No ☐ DQA: AD Date: 07/08/31
 QA: N/C Closed: 18 Date: 07.08.31

NCR: 33465

WORK ORDER NON-CONFORMANCE (NCR)

DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07-07-12	4.0	Tube - E is higher on one side by .125" Tube - A also is .125 higher on side - B though.	AS/042	cut AS instructed on tube, and the under side of the cut line to make both sides even on the height.	07-07-13 Ignore	07-07-13	AS/042	07-07-12
07-07-13	6.0	HOLES FOR SHOCK ABSORBERS ARE SHIFTED BY APPROX. 0.100". 24.61" DIM IS 24.72" & 24.72". TUBE "B"	UP 07-07-13 per AS/042	CENTER THE D3502-1 SUPPORTS BETWEEN THE HOLES (ie, SHIFT BY 0.100"). REF DS EMAIL ATTACHED	07-08-20 en 07/09/29	07-07-13 per AS/042	07-07-13 per AS/042	07-07-18

NOTE: Date & initial all entries

Process Sheet

Customer: CO-DAR01 Dart Aerospace Ltd.

Drawing Name: D350-748-141

Job Number: 33465

Part Number: D350748141

Job Number:



Seq. #:

Machine Or Operation:

Description :

17.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total: 10.0000 Each(s)

Clamp (per MIL-DTL-8783C)

Batch: 104902

ml 07 08 20

18.0

MS27039110

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total: 5.0000 Each(s)

Screw

Batch: 18836

ml 07 08 20

19.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035.

3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

ml 07 08 20

20.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

ml 07 08 20

21.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D350-748-241

Location: _____

PPP Rev: _____

ml 07 08 20

22.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

ml 07 08 31

Job Completion



ml 07 08 29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART

RELEASED

06.10.31

DESIGN QP	DRAWN BY QP	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED H	APPROVED H	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE NTS
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

SHOP COPY

RETURN TO
ENGINEERING**D350-748-141 CROSSTUBE:**

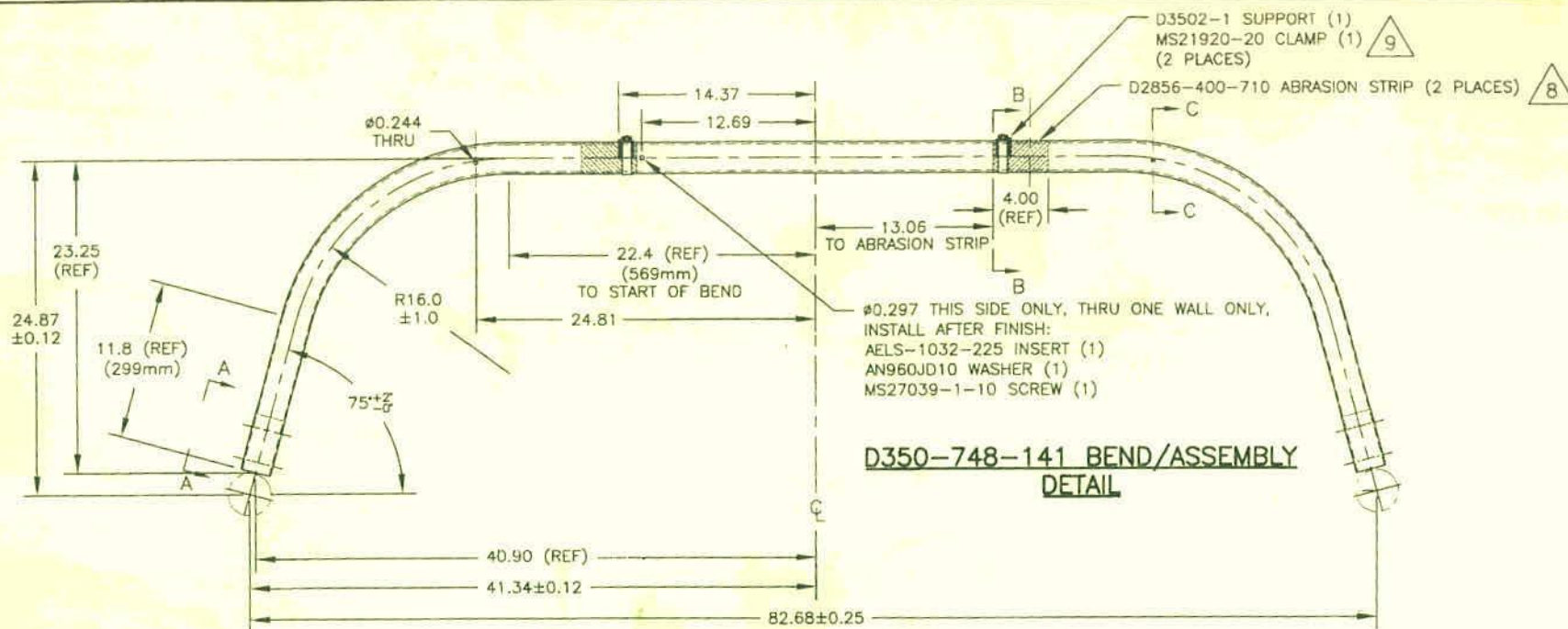
- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

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WITHOUT NOTICE**UNDER REVIEW**07.02.16
CUFF BENCH REDUCED

OK QP 07.07.11

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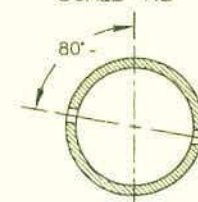
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SECTION B-B
SCALE 1:2

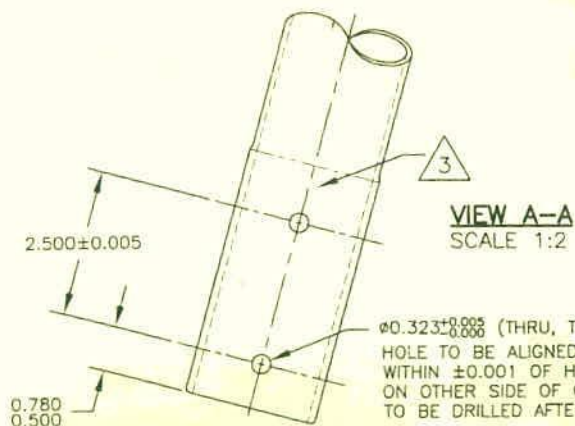


SECTION C-C
SCALE 1:2



UNDER REVIEW

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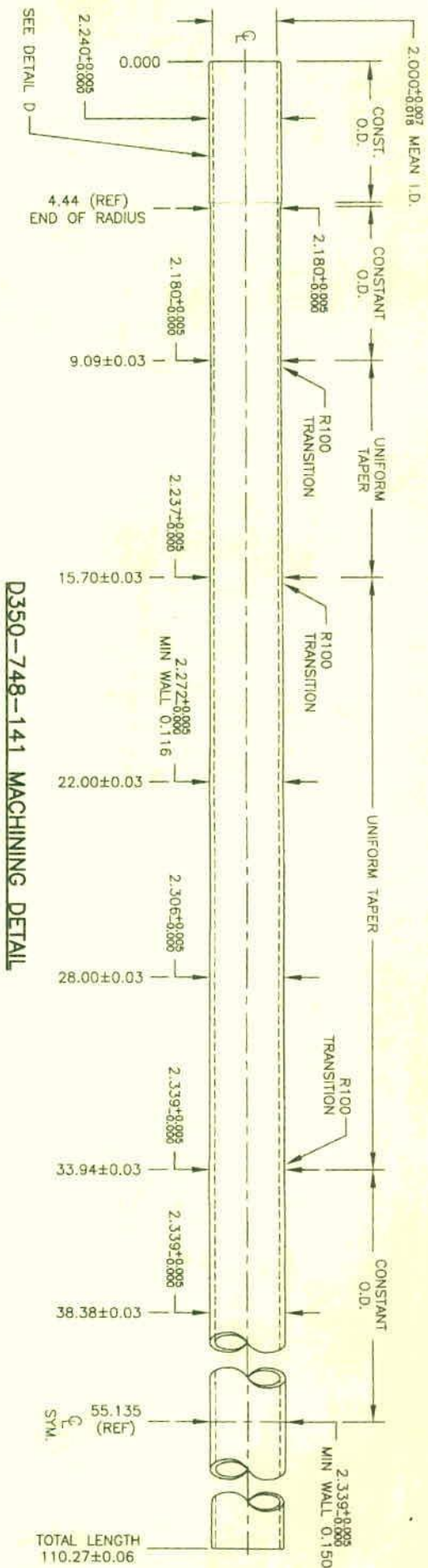
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WORK ORDER
NO. 33465
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ENGINEERING

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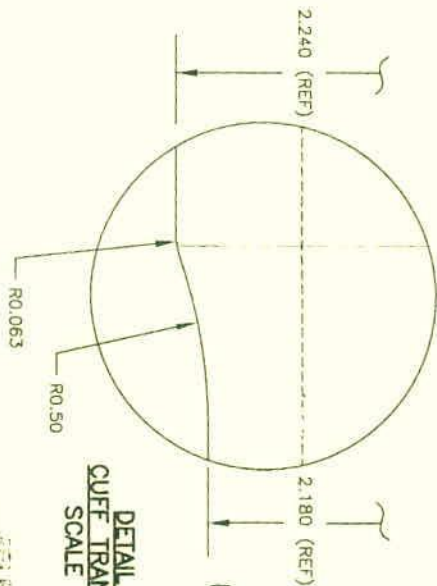
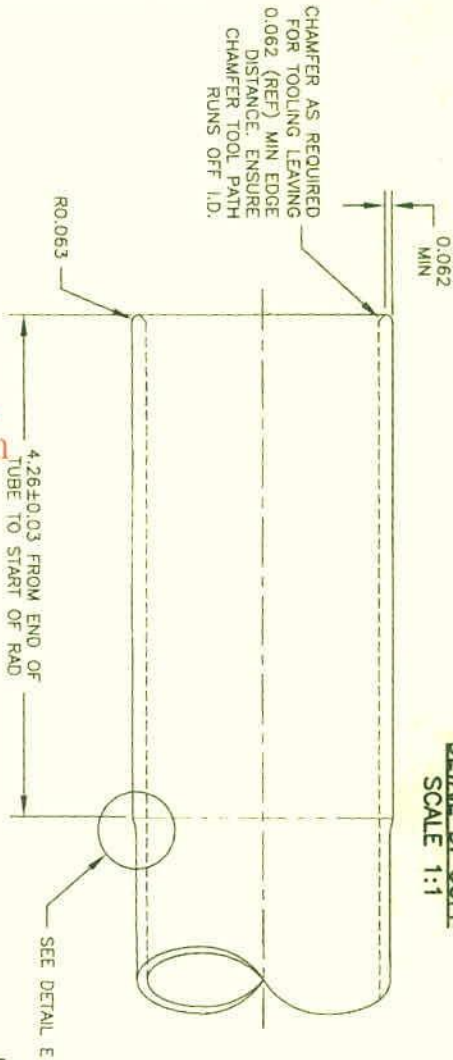
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CHECKED	#	APPROVED	#	DRAWING NO.	D350-748-141
DATE	06.10.31	TITLE	CROSSTUBE (AS 350/355 HI FWD)	SCALE	1:8

REV. D
SHEET 2 OF 3



D350-748-141 MACHINING DETAIL

DETAIL D: CUFF SCALE 1:1



DETAIL E: CUFF TRANSITION SCALE 9:1

UNDER REVIEW

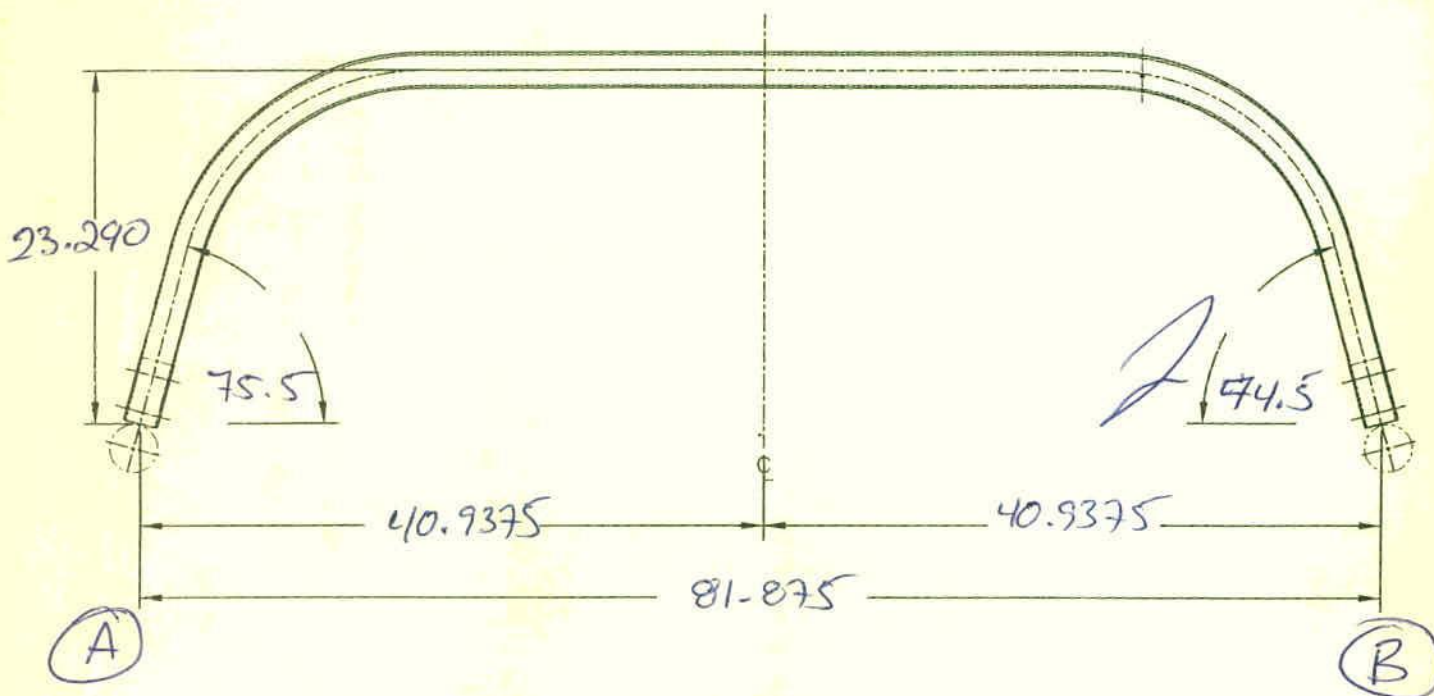
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DATE	06.10.31		D350-748-141		
TITLE	CROSSTUBE (AS 350/355 HI FWD)				
SCALE	1:3				

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WITHOUT NOTICE
WORK ORDER
NO. 33465

DART AEROSPACE LTD		Work Order:	33465-A
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141	Rev: D	Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



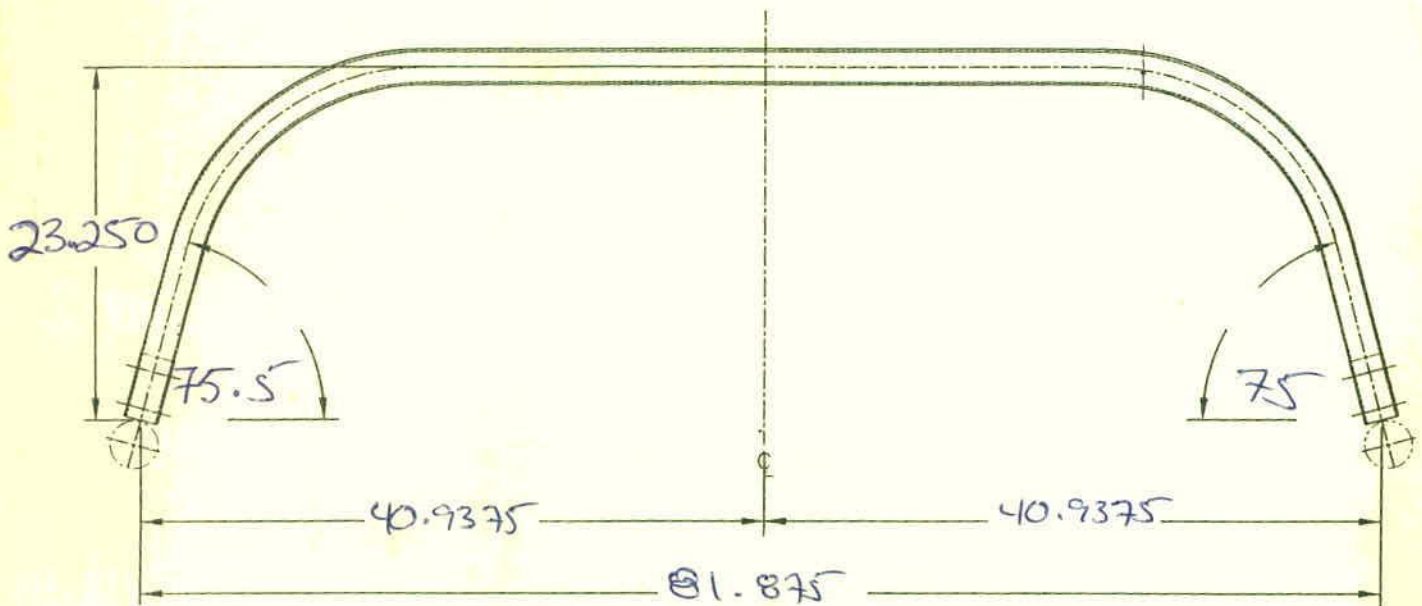
Comments
Tube is slightly higher on side B by 0.125 max.
Acceptable to cut off to match.
* Fits good in drill jig 07.07.13

QC15 Inspection	
Date	07.07.12

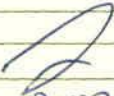
Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART AEROSPACE LTD		Work Order:	33465-B
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments

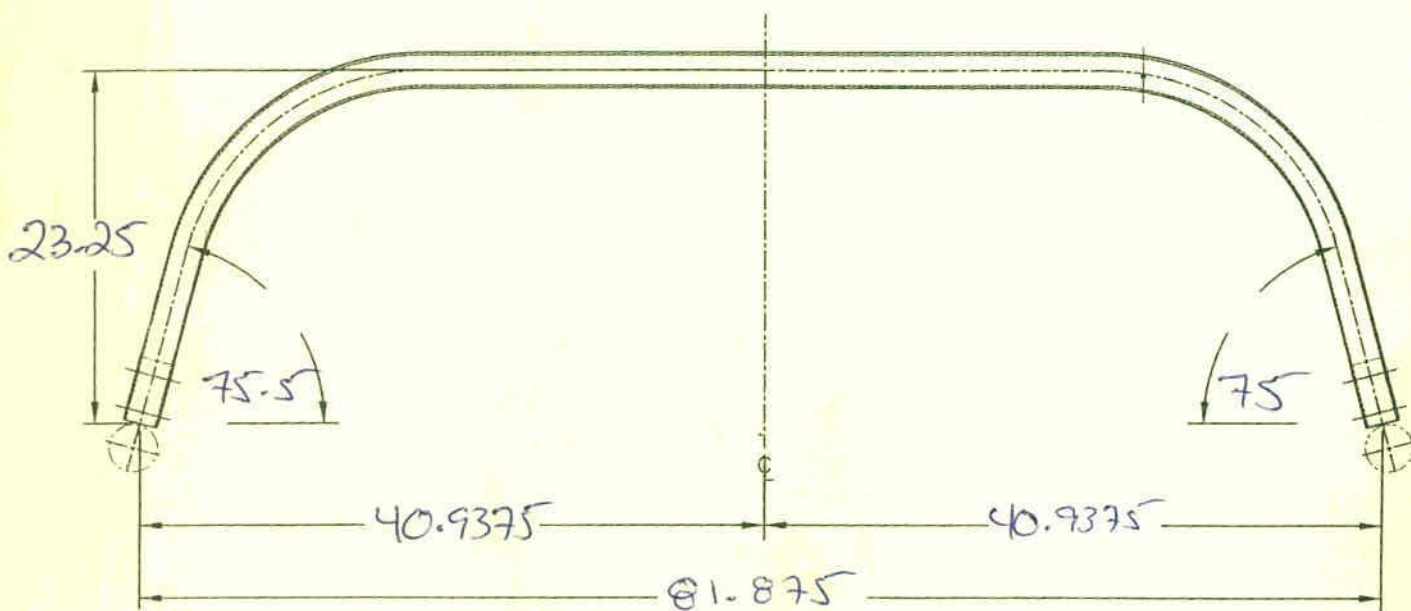
QC15 Inspection	
Date	

07-07-12

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART AEROSPACE LTD		Work Order:	33465-C
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments

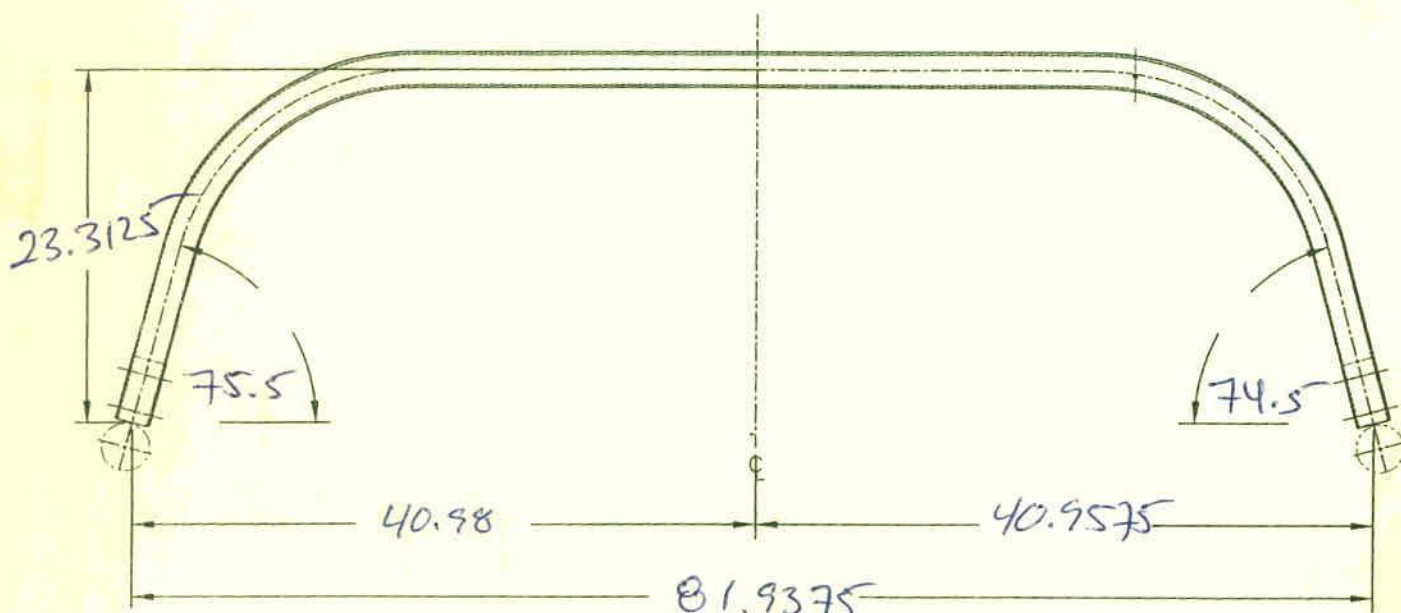
QC15 Inspection	
Date	

27.07.12

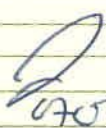
Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART AEROSPACE LTD		Work Order:	33465-D
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



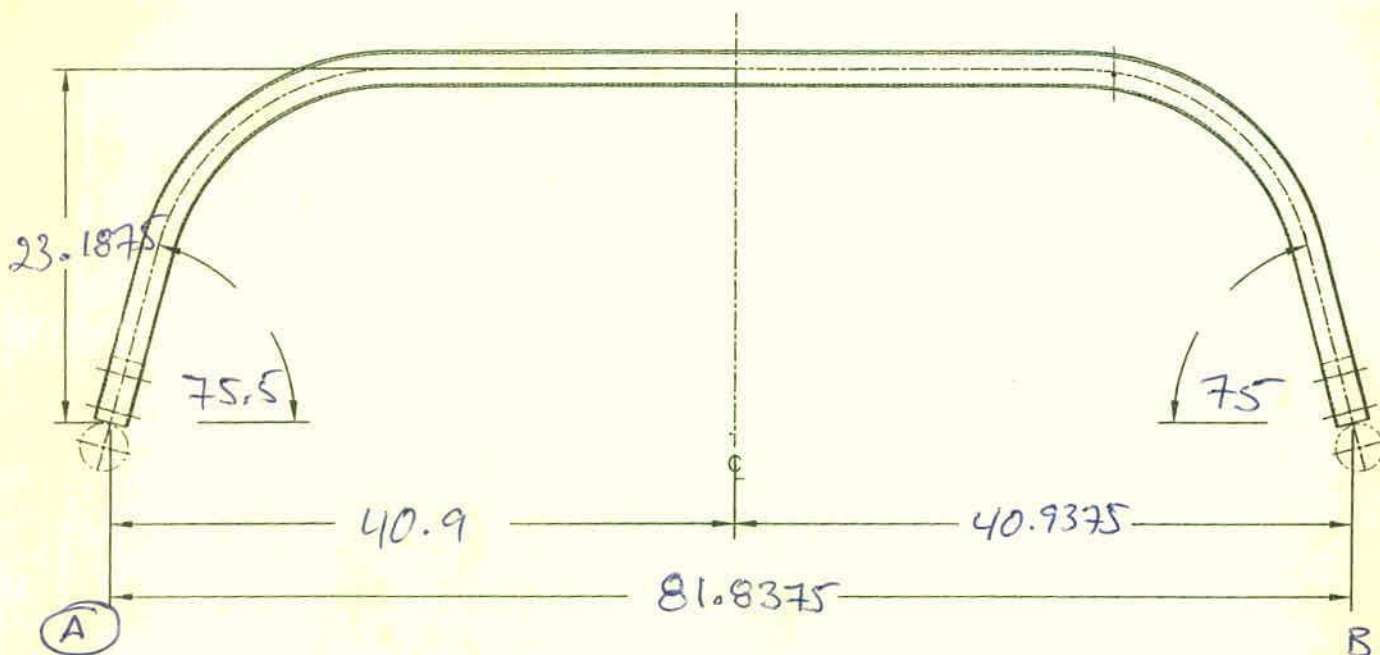
Comments

QC15 Inspection	 07.07.12
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

DART AEROSPACE LTD		Work Order:	33465-E
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Tube is slightly higher on side A, by .125.
Acceptable to cut off A to match B.
* Tube fits good in drill jig 07-07-13

QC15 Inspection	
Date	07-07-12

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	

Chris Provencal

From: David Shepherd [dshepherd@dartaero.com]
Sent: July 12, 2007 12:39 PM
To: 'Chris Provencal'
Cc: 'Marc Bellavance'
Subject: FW: NCR D350-748-141
Attachments: ncrD350748141.jpg

I don't think this is a problem.

However, looking at the sketch you provided, my preference would be to shift the center over by 0.125 so that the shock absorbers are centered.

That way, you would be out by 0.125" at the ground rather than at the supports.

Make sense?

David

From: Chris Provencal [mailto:cprovencal@dartaero.com]
Sent: Thursday, July 12, 2007 9:29 AM
To: '*David Shepherd (*David Shepherd)'
Cc: 'Marc Bellavance'
Subject: NCR D350-748-141

David,

Qty(1) D350-748-141, the holes for the shock absorbers have been shifted by about 0.125" (see attached). They think the jig moved while they were working on it. The shock absorbers will still fit since they can have a single-bolt attachment to the clamps and can pivot. Our xtubes survived drop testing without the shock absorbers, so this should not affect the strength of our tubes. This may affect the g-loading / load transfer into the fuselage, but 1/8" is unlikely to be significant.

Is this acceptable?

-Chris

No virus found in this incoming message.

Checked by AVG Free Edition.

Version: 7.5.476 / Virus Database: 269.10.4/897 - Release Date: 7/11/2007 9:57 PM

No virus found in this outgoing message.

Checked by AVG Free Edition.

Version: 7.5.476 / Virus Database: 269.10.4/897 - Release Date: 7/11/2007 9:57 PM

**CERTIFICATE OF
CONFIRMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Aug-13-2007

CONSIG NED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 68797
INVOICE #: 35484

**CONTRACT OR
PURCHASE ORDER #** 4203

DESCRIPTION: SKID

QTY 5

P/N # D350748141

S/N # B33465

**CADMIUM PLATE IAW AMS-QQ-P-416 TYPE 2 CLASS 1.MPI IAW
ASTM-E-1444. AND ACCEPTED BAKE HEAT CHARTS#8066 & 8136**

CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.

Approved Inspector:



R. LAST

